Air Quality Compliance

1. Purpose / Background
The purpose of this Standard Operating Procedure (SOP) is to describe MIT’s Air Quality Compliance program, and the procedures used by MIT personnel for controlling air pollutant emissions.

The Clean Air Act (CAA) and its 1990 amendments were established to improve air quality and to protect human health and the environment from common air pollutants that are emitted from various industries. The CAA amendments establish a national permit program known as the Title V Operating Permit program, which encompasses most programs of the CAA.

2. Scope
Air pollutants regulated under the CAA are commonly emitted at MIT’s Cambridge campus from a number of sources, including boilers, emergency generators, and parts cleaners. A process or equipment (emission source) at MIT has the potential to be included in the Air Quality Compliance Program if it uses and/or emits any of the following substances above threshold levels:

- volatile organic compounds (VOCs);
- carbon monoxide (CO);
- carbon dioxide and other greenhouse gases (GHGs);
- nitrogen oxides (NOx);
- sulfur dioxide (SO₂);
- lead;
- particulate matter with diameter of 2.5 micrometers or smaller (PM₂.₅);
- particulate matter with diameter of 10 micrometers or smaller (PM₁₀);
- any ozone depleting substance (ODS); and
- Hazardous Air Pollutants or HAPs.

Lincoln Laboratory Department of Facilities and EHS Office manage the Air Quality Compliance Program at Lincoln Labs and should be contacted for questions at that facility.

3. Prerequisites
All personnel must be knowledgeable of materials and/or equipment present in their laboratories and/or spaces to know whether it might be an air emission source. Contact EHS Office if unsure whether materials or equipment is an emission source.

4. Procedures
4.1. Stationary Source Air Emission Inventory
Maintaining a current air emission source inventory is an integral part of complying with air regulations at MIT. Environmental Management Program (EMP) of MIT’s Environment, Health & Safety (EHS) Office updates the MIT’s Cambridge campus air emission source inventory on an
annual basis to determine the facility’s source registration requirements and compliance with its Air Quality Program.

DLCs must notify EMP prior to installing, removing and/or replacing any air emission source. Upon notification, EMP will add and/or remove sources from the inventory.

Examples of Stationary Air Emission Sources include:

- Boilers
- Combustion Turbines
- Water Heaters
- Parts Cleaners/ Degreasers
- Experimental Engines
- Printing Operations
- Fuel Dispensing
- Emergency generators
- Space Heaters
- Storage Tanks
- Painting/Coating Operations
- Soldering Operations
- Welding Operations
- Fuel Cells

EHS Office’s Laboratory and Facility Design and Construction Review Services Team provides EHS services including but not limited to regulatory review of air emission sources to the Department of Facilities (DOF) Project Managers.

4.2. Source Registration

New emission units, including those that are exempt from permitting requirements, are registered with MA Department of Environmental Protection (MassDEP) in the next required Source Registration (the annual air emission report filed with the MassDEP). EMP files Source Registrations for a given calendar year by April 15 of the following year. Source Registration covers all units in the air emissions inventory on Cambridge campus.

4.3. Permitting

Permits are required for many activities that result in air pollutant emissions. Air permits identify what pollutants are emitted, how much can be released according to standards, and what controls are implemented to reduce emissions, including plans to monitor the emissions at the site. Activities requiring a new permit generally involve the construction, reconstruction, or alteration of a source, or a change in its use or operation. In general, two types of permits may be required: 1) Pre-construction Permit; and 2) Operating Permit (Title V).

4.3.1. Pre-construction Permit

If air emission sources are to be constructed, reconstructed, or modified, EMP will evaluate permitting requirements and advise DLC on which permit application must be submitted to the Mass DEP prior to the event. Provisions in the permit application are incorporated into the Title V Permit once the new source becomes operational.

Certain emission sources may be exempted from air quality permitting:

- Such as emergency generators with a rated power output equal or greater than 37kW installed after March 23, 2006 if they comply with the applicable emission limitations

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set by the Environmental Protection Agency (EPA) and by MassDEP in 310 CMR 7.26(42)(b) ; or

- if the emission source is included in the exemption categories outlined in the MassDEP regulations 310 CMR 7.02(2).

4.3.2. Operating Permit (Title V)
Title V permits are required if the facility is a major source emitter of any criteria pollutant or Hazardous Air Pollutant (HAP). EMP holds an Air Quality Operating Permit (Title V permit) from the MassDEP for the MIT Cambridge campus. EMP is responsible for maintaining and updating the permit as needed. Title V Permits are renewed every 5 years. EMP will submit the Title V permit renewal application to the MassDEP at least 180 days prior to the existing permit expiration date. In addition, EMP submits an application for revisions to the existing Title V Permit if there are significant changes to the emission sources at the facility.

4.4. MIT Title V Permit
The MIT Title V permit identifies air emission equipment subject to and regulated by the permit. EMP maintains a copy of the up-to-date exempt sources at the EHS office and provides the updated list to the MassDEP Regional Office when requested.

4.4.1. Applicable Requirements
Section 4.A, Table 3, of the Title V permit identifies emission limits and/or restrictions applicable to MIT emission sources.

4.4.2. Compliance Demonstration
Section 4.B, Table 4, of the Title V permit identifies monitoring/testing requirements applicable to MIT Title V emission sources. Periodic sampling and stack testing are conducted to demonstrate compliance performance.

4.4.3. Recordkeeping Requirements
Section 4.B, Table 5 and Table 6, of the Title V permit identifies recordkeeping and reporting requirements applicable to MIT Title V emission sources. Records such as hourly logs, fuel usage, fuel types and heating values, and performance testing results are kept for various emission sources.

4.5. New Source Performance Standards
New Source Performance Standards (NSPSs) set limits to control criteria pollutant emissions (especially VOCs) and air toxics from approximately 60 different emission sources, such as storage vessels for petroleum liquids, and combustion units. The following emission units are subject to the following NSPSs:

40 CFR 60 Subpart GG (§60.330 – §60.335) – Standards of Performance for Stationary Gas Turbines
40 CFR 60 Subpart Dc (§60.40c – §60.48c) – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

4.6. Acid Rain Program
The Acid Rain Program, codified in 40 CFR Part 75 of the CAA, establishes requirements for the monitoring, recordkeeping, and reporting of SO2, nitrogen oxides (NOx), and carbon dioxide (CO2) emissions, volumetric flow, and opacity data from affected emission units. In addition, the Acid Rain Program sets forth provisions for the monitoring, recordkeeping, and reporting of NOx mass emissions with which MA DEP require sources to comply with in order to demonstrate compliance with the NOx mass emission reduction program.

Section 4.B of the MIT Title V permit identifies each emission unit subject to 40 CFR Part 75, and references the applicable monitoring and recordkeeping requirements for each emission unit. EMP will update the Title V permit if sources subject to the Acid Rain Program are constructed, reconstructed, or modified.

4.7. National Emission Standards for Hazardous Air Pollutants
National Emission Standards for Hazardous Air Pollutants (NESHAPs) set standards to control toxic pollutant emissions from 174 industrial and commercial source categories that are major or area sources of HAP emissions. MIT is not currently a major or area source of HAP emissions. EMP will update the Title V permit if sources subject to NESHAP are constructed.

4.8. Greenhouse Gas Reporting
On August 7, 2008, Governor Deval Patrick signed the Global Warming Solutions Act (GWSA) that requires the state and hence regulated entities to reduce emissions of the greenhouse gases (GHG) that cause global warming by between 10 percent and 25 percent by 2020 and 80 percent by 2050.

Carbon dioxide (CO2) is by far the most ubiquitous GHG. It is emitted through any use of fossil fuels, from driving to heating to computing. However, there are many other GHG that might be emitted on a regular basis. Some of these are very significant, despite being released in much lower volumes than CO2, because they trap much more heat per unit of mass. The power of a GHG to trap heat is measured as a factor of CO2’s heat-trapping power. This value is referred to as the gas’s global warming potential (GWP). Other common GHG such as methane (CH4), Nitrous oxide (N2O), sulfur hexafluoride (SF6) and various refrigerants are tens, hundreds or thousands of times more powerful than CO2.

All regulated facilities (of which Cambridge campus is one) are registered with MassDEP. EMP reports all GHG emissions that include emissions from stationary (boilers, generators, etc.) as well as mobile (vehicles, lifts, etc.) sources and all fugitive emissions to the EPA by March 30 of each year and to the state by April 15.

4.9. Ozone Depleting Substances
The CAA amendments ban the production, use, import and export of Class I and Class II ozone depleting substances (ODSs) or CFC-containing refrigerant. DOF maintains a list of certified technicians that maintain, service, repair, and/or dispose of equipment that contains refrigerant.

Refrigeration equipment includes:
- Refrigerators and freezers
- Dehumidifiers
- Cooling towers
- Heating, ventilation and air conditioning equipment (HVAC)

DOF manages all refrigeration equipment that contains more than 50 pounds of refrigerant and ensures that the equipment is approved for use in accordance with DOF’s Refrigerant Management Plan. For equipment containing 50 pounds or more of regulated refrigerants, the following records (including vendor records) are kept at the Department of Facilities:
- Maintenance records dating back 3 years documenting the date and type of service for the appliance
- Records dating back 3 years documenting the amount of refrigerant purchased for the appliance

4.10. Rideshare Reporting
MIT is also required by MassDEP to comply with the Rideshare Regulations, which call for reduction of single-occupancy vehicle trips to campus.

EMP submits an annual report that includes:
- The total number of commuters
- The number of commuters who use public transportation
- The number of single-occupant commuter vehicles
- The number of commuters who customarily carpool
- The number of commuters who customarily vanpool
- The number of commuters who use other means of transportation
- The percentage which is single-occupant vehicles
- The number of van-type vehicles with 8 or more commuters
- The type of carpool matching program and description
- The level of participation achieved in the most recent program
- The types of incentives offered
- Promotional strategies used

To comply with the Rideshare regulations and assist in providing data that MIT may use in its efforts to reduce greenhouse gas emissions associated with our campus, EHS Office in collaboration with Department of Facilities surveys the entire MIT community. This transportation survey is usually done in the fall on a biennial cycle.

4.11. Risk Management Planning (RMP)
The Chemical Accident Prevention Provisions or Risk Management Plan (RMP) regulations require facilities that store listed toxic and flammable chemical substances in quantities greater than regulatory threshold limits to prepare and implement a Risk Management Program. In addition, facilities producing, processing, handling or storing regulated substances or extremely hazardous substances must meet the following obligations of the General Duty Clause:

- Identify hazards which may result from accidental releases using appropriate hazard assessment techniques
- Design and maintain a safe facility by taking steps necessary to prevent releases
- Minimize the consequences of accidental releases which do occur

EMP monitors the chemical inventories and chemical storage amounts on site for those chemicals potentially subject to RMP through the annual Chemical Reporting process. Currently all chemicals at the MIT Cambridge campus are stored in quantities below regulatory applicability thresholds.

5. Roles & Responsibilities

The EHS Office has the primary responsibility for ensuring that laboratory and facilities personnel follow the Institute’s procedures for complying with the Title V permit monitoring, recordkeeping, and reporting requirements.

The Environmental Management Program (EMP) is responsible for the oversight of the Title V Operating Permit. EMP is primarily responsible for all questions or determinations pertaining to the permitting of air emission sources, control of air pollutant emissions, and recordkeeping and reporting requirements of the Title V permit.

Departments, Labs and Centers (DLCs) that operate air emission sources must implement and/or evaluate procedures in this SOP. These DLCs currently undergo routine inspections by EMP. However, if a DLC did not operate air emission sources in the past, and new air emission sources are installed or operated, EMP must be notified.

DLC EHS Coordinators are required to notify EMP whenever items such as boilers, emergency generators, parts cleaning units, painting operations, printing operations, or other items with the potential to emit air pollutants are installed, removed or modified. EMP is responsible for evaluating these projects for their potential to emit air pollutants and will include them in the overall Title V Operating Permit if necessary. Notification is not required for installation of wet benches, laboratory hoods, or equipment that does not have the potential to emit air pollutants.

The EHS Office provides support in all areas of air pollution control, including:

- Conducting regulatory applicability analysis for new, reconstructed, or modified air emission equipment/units
- Permitting air emission equipment
- Identifying appropriate controls for air emission equipment
- Developing recordkeeping and reporting logs for specific air emission equipment/units

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See Legal Disclaimer at: [http://ehs.mit.edu/site/content/legal-disclaimer](http://ehs.mit.edu/site/content/legal-disclaimer)
- Providing training or operation and maintenance procedures for regulated air emission equipment/units
- Assessing opportunities to reduce or prevent emissions, where feasible
- Notifying DLCs when a change in the regulations affects DLC operations

The DOF EHS Coordinator maintains the Refrigerant Management Plan. DOF and other DLC EHS Coordinators provide fuel usage information to EMP for use in the Source Registration Process.

6. Training and Certification
   Persons, including contractors, performing stack testing on air emission equipment in order to ascertain compliance with the Title V permit shall be knowledgeable in stack testing and procedures for conducting stack tests.

   Persons conducting 40 CFR 60 Appendix A EPA Method 9 Opacity Monitoring shall be certified.

   Technicians maintaining, servicing, or repairing appliances containing refrigerants shall be certified by an approved program and shall meet the following requirements:
   - For small appliances, certified as Type I technicians
   - For high-pressure appliances (not including small appliances or MVACs), certified as Type II technicians
   - For low-pressure appliances, certified as Type III technicians
   - For those working on all types of appliances, certified as Universal technicians.

   Training and certification records are kept at the Department of Facilities.

7. Monitoring Requirements
   Air emission sources are inspected annually to maintain an accurate air emission inventory. Records and equipment are also reviewed to evaluate compliance with regulatory requirements. Section 4 of the MIT Title V permit identifies specific monitoring and inspection requirements for regulated air emission equipment.

   Accidental releases of airborne chemicals must be immediately reported to the EHS Office as outlined in the Spill and Release Procedures SOP.

8. Record Management
   EMP, DOF EHS Manager and DOF Central Utility Plant (CUP) staff are jointly responsible for maintaining records and reports required by federal and state regulations. The Source Registration, Title V permit and associated records, the Title V annual and semi-annual compliance certifications and other compliance reports are stored at the EHS office. Current air emission inventories are also kept at the EHS office.

   EMP submits the following documents to the regulatory agencies:

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9. References
Additional resources that may be useful in performing the procedures identified in this SOP include:
Title V Air Quality Operating Permit (MBR-95-OPP-026)

9.1. Standards
40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards
40 CFR 60 – Standards of Performance for New Stationary Sources
40 CFR 68 – Chemical Accident Prevention Provisions
40 CFR 70 – State Operating Permit Programs
40 CFR 75 – Continuous Emission Monitoring
40 CFR 82 – Protection of Stratospheric Ozone
310 CMR 7.00 - Air Pollution Control

9.2. Other SOP/ SOGs
EHS Records Retention
Spill Response Procedures
Laboratory and Facility Design and Construction Review
Chemical Reporting

9.3. Supplementary Documents
None

10. Definitions
Area Source – emit less than major source thresholds of criteria and HAP pollutants as an individual facility, but collectively, the facility/industry type contributes to large amounts of regulated pollutant emissions (e.g., dry cleaners)
Criteria Pollutants – Six pollutants (CO, NOx, SO₂, ozone, PM10 and lead) for which NAAQS were established in 1970

Emergency generators- any stationary internal combustion engine which operates as an emergency or standby mechanical or electrical power source.

Exempt source – insignificant activities proposed to be exempt under 310 CMR 7.00: Appendix C (5) (h) e.g. combustion units under 3 MMBtu/hr.

Hazardous Air Pollutant (HAP) – an air contaminant designated as such by EPA.

Major Source – any stationary source or any group of stationary sources (such as Cambridge campus) that have the potential to emit more than 50 tons per year of VOC or NOx.

National Ambient Air Quality Standards (NAAQS) – air quality standards established to protect the environment

Volatile Organic Compounds (VOCs) --- Any compound of carbon that participates in atmospheric photochemical reaction.